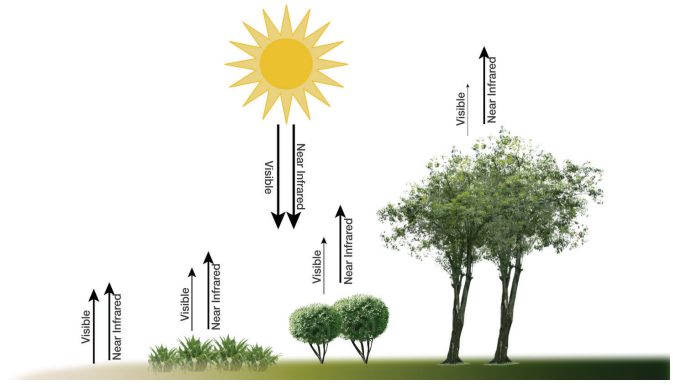
GREEN
Vegetation on Our Planet

WHY GREEN?

The vegetation imagery is created from a year's-worth of data collected by the NOAA/NASA Suomi NPP satellite. The satellite is sending extraordinary new images back to Earth, giving a clearer picture of vegetation around the world. The greenest parts of the images represent the healthiest vegetation as it absorbs the most visible sunlight. The images are created by data sent back to Earth from the Visible-Infrared Imager/Radiometer Suite (VIIRS) instrument on board the satellite. VIIRS detects changes in the reflection of that light, producing images that measure changes to vegetation over time.

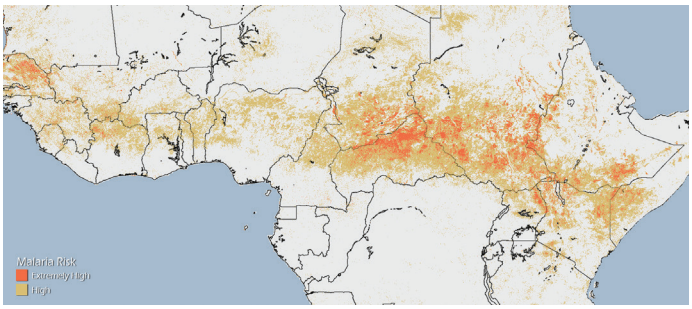


More vegetated areas absorb more visible light and reflect more near-infrared light back into space. Satellites can detect these relative differences, which are used to create vegetation indices.

WHAT CAN WE LEARN?

This year, the Suomi NPP vegetation data will be incorporated into many Normalized Difference Vegetation Index (NDVI) -based products and services, including weather and environmental predication models, and the U.S. Drought Monitor. Additionally, NOAA's vegetation data are used by other organizations and federal agencies, including the U.S. Department of Agriculture and U.S. Geological Survey for agricultural predictions and assessments.

Vegetation data has many applications, from weather and ecological forecasting, to understanding best practices for land use. Pixel by pixel analysis of vegetation changes from week to week to give an early warning for the outbreaks of drought, hazardous fire conditions, or even when malaria may break out in Sub-Saharan Africa. Because vegetation greatly affects runoff, surface temperature, and relative humidity of an area, more complex weather forecasts are beginning to integrate vegetation dynamics into numerical models.



As vegetation grows in Sub-Saharan Africa, so does the risk for malaria. Vegetation indexes provide world health organizations the lead-time needed to distribute supplies and medicine.

THE SCIENCE.

For the past 22 years, NOAA has used the AVHRR sensor on its POES polar-orbiting satellites to generate vegetation indexes at a resolution of 4 km per pixel. In 1999, NASA launched the first MODIS sensor on the Terra satellite, improving data gathering. Today, VIIRS produces data that is 8x more detailed than AVHRR. Computer programs are used to identify the best cloud-free measurement for every spot on the planet, and those individual measurements are added together to form a single cloud-free mosaic of the planet. Computing weekly mosaics from data at such high resolution is no trivial matter. The VIIRS sensor acquires 330 megabytes of data every minute just for the four channels of visible and infrared imagery used in the vegetation index. Multiply that over one week and it is an astounding 2 TB of data - more than 40 Blu-ray Disc movies - and that does not even include the other 17 channels of data collected by VIIRS. At 500 meters per pixel, the images that the data generates are equally large. Each weekly colorized vegetation image is around 13 gigabytes in size and 80,000 x 40,000 pixels in dimension. Think of it another way: if you were to print the image it would require a piece of paper 1,111 inches long by 555 inches wide (or 93 x 46.5 feet).

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